2 | Introduction

Study Area

The City of Durham Downtown Parking Study considered a smaller study area centered on Ninth Street, which represents a heavily used area of the City that is remote to the Downtown core. The official study area is bordered by Green Street to the north, West Main Street to the south, Iredell Street to the east, and Erwin Mills to the west.

This study area represents a district of the City that has historically been a retail and restaurant hub prime for future development and activity. Though the area is small, approximately 55 retail and restaurant businesses operate within the footprint. The anchor of the study area is along Ninth Street primarily between West Markham Street and West Main Street, with residential areas north of West Markham Street and ancillary businesses along Iredell Street. The Bull City Connector bus transit serves the study area with stops at the far south along West Main Street at the intersection with Iredell Street (westbound route) and Broad Street (eastbound route).

The Erwin Mills development, located in Figure 2.1, lies immediately outside and to the west of the study area. This development was not included, as the parking demand from the office space within the development is largely met with the surface parking surrounding the building. In addition, the ownership of the development has communicated no desire to engage in a lease agreement with business owners or the City, therefore, the potential of using this parking to meet evening and weekend parking demands within the study area shown cannot be relied upon.

Figure 2.1 – Ninth Street Study Area

3 | Existing Conditions

Prior to determining the overall parking demand in a study area, it is important to understand the existing parking supply and how it operates. A thorough inventory of the existing parking supply was conducted in August 2012. Parking data also was collected on a typical weekday (Wednesday, August 29, 2012) and a weekend day (Saturday, August 25, 2012), to identify occupancy, duration, and turnover. Figure 3.1 shows the existing parking facilities within the study area (on-street and off-street). The following sections document the parking inventory and existing conditions of parking within the Ninth Street study area.

Figure 3.1 – Ninth Street Study Area Parking Facilities

Existing Parking Inventory

Based on field observations and data provided by the City, it was determined that there are approximately 1,347 spaces within the Ninth Street study area. To quantify the existing parking supply in its entirety, the following parking types were noted.

- On-street unmarked
- On-street marked
- Surface lot

The parking inventory identified characteristics of the parking supply for each parking type. For on-street unmarked spaces, the total number of available parking spaces was documented, along with time restrictions. For on-street marked and surface lot spaces, the total number of parking spaces was documented, along with the type of parking space (handicapped, restricted, or public), the orientation of the parking space (perpendicular, parallel, or angled) and time restrictions. Table 3.1 summarizes the total number of parking spaces by parking type within the Ninth Street study area. The sections following the table further define the parking types.

Table 3.1 – Ninth Street Existing Parking Inventory

Parking Type	# of Spaces
On-street unmarked	348
On-street marked	4
Surface lot	995
Total	**1,347**

- On-street unmarked

  On-street unmarked parking represents available public parking along streets in neighborhoods and commercial areas that are not delineated by any pavement markings. All parking of this type is parallel. Although these areas do not have a defined parking space count, they were included in the inventory because they do contribute to the Ninth Street study area parking supply. On-street unmarked spaces were estimated by measuring the length of unobstructed curb parking per block and dividing that length by an average parking space length of 25 feet. This calculation excludes areas adjacent to driveways, intersections, and other obstructions, such as fire hydrants. On-street unmarked parking, with 348 spaces, represents 25% of the total parking supply. Many of the spaces in this parking type were time restricted, which varied by location from 3-hour (Ninth Street, south of West Markham Avenue, and sections of Perry Street), 2-hour (Iredell Street, south of West Markham Avenue, and sections of Perry Street), and 1-hour (Ninth Street and north of West Markham Avenue)

- On-street marked

  On-street marked parking represent available public parking along streets in commercial areas that are delineated by pavement markings for parallel parking. On-street marked parking, with 4 spaces, represents < 0.5% of the total parking supply. The on-street marked spaces within the study area are limited to a small quantity of spaces on Ninth Street adjacent to 8 Alley. These spaces are either time restricted to 3-hours or restricted to handicapped accessible parking.

- Surface lot

  Surface lot parking represents public and private spaces located in off-street lots spread throughout the study area that serve a variety of uses. The majority of off-street surface lot parking is delineated by pavement markings for 90 degree parking and two-way traffic flow, with the exception of the surface lot at the southeast corner of Perry Street and Ninth Street, which has angled parking. Surface lot parking, with 995 spaces, represents 74% of the total parking supply. Of the total surface lot parking, 46 spaces (5%) are operated and maintained by the City as public parking and 949 spaces (95%) are privately owned. The City owned surface lot time restricts parking to 2-hours.

  The City owned off-street surface lot located along Ninth Street between Perry Street and West Markham Avenue is currently in the process of being converted by the City from a free time restricted lot to a paid lot. It is expected that this transition will be complete in late 2013 or early 2014. The technology and equipment used in this lot should be identical to that implemented in the Downtown Study Area to increase familiarity and decrease confusion for users.

Parking Enforcement

There are a number of posted time restrictions throughout the Ninth Street study area. However, there is little active enforcement of these restrictions. Currently, the City contracts Lanier Parking Solutions to operate and enforce parking within the Downtown study area, as well as the residential areas around Duke University and North Carolina Central University. Areas beyond these, including the Ninth Street study area, are the responsibility of and enforced by the Police Department.

When parking is enforced, however, Lanier Parking Solutions dedicates four "ambassadors" to patrol the streets in beats that are daily assigned on a rotating basis. The current enforcement method allows an ambassador to assign an electronic "chalk time" associated with a vehicle license plate number and parking space. A vehicle parked in a space beyond the posted time limit, plus a 5 minute grace period, is issued a citation. A typical parking citation is issued as a $10 fine, if paid within 30 days from issuance. If paid between 30 and 45 days from issuance, the fine increases to $20, and if paid after 45 days, the fine increases to $45.


Parking Violation
City of Durham, NC

Parking Violation Number
33504531

Date: 10/19/2012 Time: 08:40
Officer: C-80
Violation: PARKING IN NO PARKING AREA
NO COMMENT

If paid within 30 days Fine: $ 10.00
If paid after 30 days but within 45 days Fine: $ 20.00
If paid after 45 days Fine: $ 45.00

License Number
NORTH CAROLINA/ 2012

Make SATURN4 DOOR RED

Location
200 SOUTH SEMINARY AVE.

PAY ONLINE AT:
may be immobilized.

Parking Violation

Data Collection

When analyzing existing parking conditions, it is important to understand the nature of the actual parking demands within the study area. Parking occupancy data can help determine peak usage periods, trends for usage, and hot spots that are used more than others. Parking duration and turnover data can help determine the actual effectiveness and usage of the parking supply, as well as the effectiveness of time restrictions. The following sections describe the data collection efforts for this study, specifically focused on the following:

- Occupancy: The number, or percentage, of vehicles occupying parking spaces in a particular facility (on-street, off-street) at a particular point in time.
- Duration: The length of time a given vehicle remains in the same parking space.
- Turnover: The number of different vehicles that park in the same parking space during a specified period of time.

Parking occupancy and duration data was collected throughout the study area to capture a typical weekday and weekend evening condition. The typical weekday data was collected hourly between 11:00 AM and 8:00 PM on Wednesday, August 29, 2012. The typical weekend evening data was collected hourly between 5:00 PM and 10:00 PM on Saturday, August 25, 2012. While occupancy data was collected for all on-street and off-street spaces within the study area, duration data was collected for select areas within the study area. Occupancy and duration data were collected in conjunction with one another to develop a more accurate picture of parking conditions in the study area. Duke University move-in occurred the week prior to the weekend evening data collection timeframe; therefore, the data collected is assumed to be a "peak existing condition" for the study area.

A comprehensive database was created with the data collected to map and analyze the utilization assessment. The following sections describe and graphically communicate existing conditions inclusive of occupancy, duration, and turnover.

Data Collection Results

- Occupancy

Occupancy was evaluated for a typical weekday and a typical weekend day to provide an understanding of the occupancy rates and their relationship within the study area. The occupancy data presented in this section is expressed in a range of percent occupied and color coded. The occupancy ranges used, associated color, and definition of each range is shown below.

0 – 50%	→	Facility operating under capacity
50 – 75%	→	Facility well utilized
75 – 90%	→	Facility approaching perceived capacity
90% +	→	Facility is perceived to be over capacity

Typically, a parking system is considered at capacity when occupancy approaches 85 – 90% of capacity. The 10 – 15% excess supply keeps the time required to find a parking space within reason and promotes a perception of adequate parking. When parking occupancy exceeds these levels, there may be delays and frustration in finding a space, patrons may be forced to use a space that is too far from their destination or does not offer a comfortable walking environment. This margin also allows for: (1) the activity of vehicles moving in and out of parking stalls during busy periods; (2) surges in short-term parking activity; and (3) the temporary loss of spaces due to improperly parked vehicles, weather conditions, construction activity, etc.

Weekday Occupancy

Figure 3.2 shows the study area occupancy for a weekday mid-day (1:00 – 2:00 PM). The majority of parking is efficiently utilized or operating under capacity. However, on-street parking adjacent to 705 Broad Street is over capacity. Another item to note is the timed off-street lot located on the west side of Ninth Street. This lot is the premier location for off-street parking in the study area.

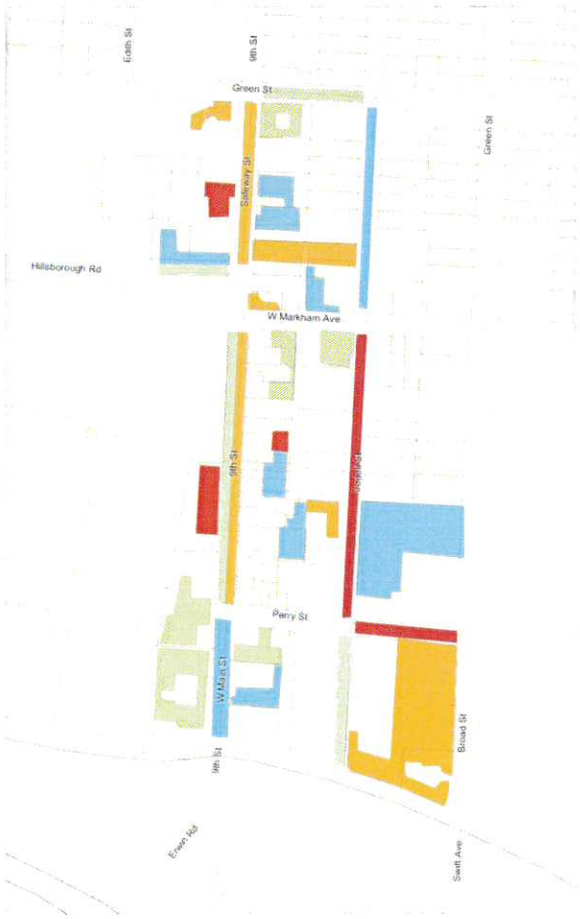

Figure 3.2 – Weekday Mid-day Occupancy

Figure 3.3 – Weekday Late Afternoon Occupancy

Figure 3.3 shows occupancy for a weekday late afternoon (4:00 – 5:00 PM). In this timeframe, the majority of parking in the study area is underutilized, with the exception of a few off-street lots scattered through the study area. The on-street parking along Ninth Street remains fairly well utilized since users during this timeframe are starting to come to the study area for after work activities.

Figure 3.4 shows the study area occupancy for a weekday evening (7:00 – 8:00 PM). It should be noted that while additional on-street supply is available on Iredell Street, it remains underutilized, during a time when on-street parking is in high demand. Another item of note is the off-street lot on the corner of West Main Street and Broad Street. This lot remains highly utilized through the day, as this lot serves a grocery store, which typically remains active throughout the day.

Figure 3.4 – Weekday Evening Occupancy

Weekend Occupancy

Figure 3.5 shows occupancy for a weekend late afternoon (6:00 – 7:00 PM). In this timeframe, on-street parking along Ninth Street is fairly well utilized, while off-street parking along Ninth Street and Safeway Street are over capacity. On-street parking along Iredell Street remains underutilized, even during a time where the heart of the study area is near peak condition.

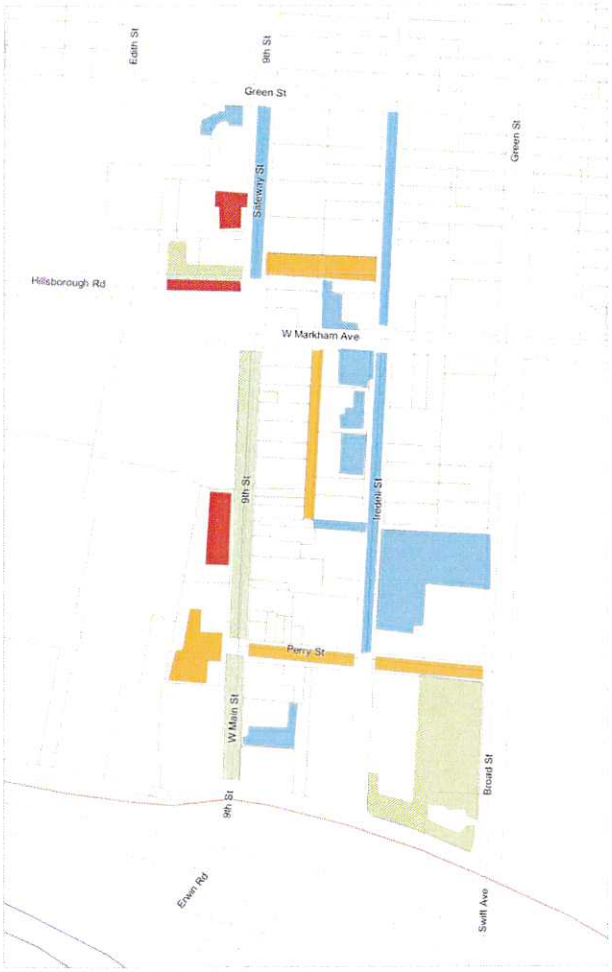

Figure 3.5 – Weekend Late Afternoon Occupancy

Figure 3.6 – Weekend Evening Occupancy

Figure 3.6 shows the study area occupancy for a weekend evening (9:00 – 10:00 PM). While the eastern portion of the study area is underutilized, the core along Ninth Street is approaching capacity. The off-street lot at the corner of Ninth Street and Perry Street remains highly utilized, drawing potential on-street patrons from Ninth Street. On-street parking along Iredell Street remains underutilized, during what is considered a peak condition for the study area.

The occupancy figures yield the following general observations for the study area.

- Typically, the highest occupancy levels were identified in the on-street and off-street facilities immediately surrounding the core of Ninth Street.
- On-street occupancy surrounding 705 Broad Street becomes over utilized during work hours. The likely cause for this high utilization is that employees of the 705 Broad Street building are required to purchase a parking permit to use a space in the off-street lot. As a result, employees opt out of the permit and find on-street parking as an alternative. This results in congested roadways along Iredell Street and Perry Street.
- On-street parking along Ninth Street experiences consistent use throughout all study periods with the highest utilization during the evenings.
- When Ninth Street on-street parking is at a peak, on-street parking on Iredell Street remains significantly underutilized.
- Areas north of West Markham Street are more used during the week, when compared to the weekend. The off-street lot to the west of Safeway Street remains highly used through all study periods.
- A private, gated, off-street lot located mid-block on Perry Street, between Ninth Street and Iredell Street is not used during any time period. This lot does not show on the occupancy figures, as a value of "0" was collected for each time period. This lot is owned by Wells Fargo and intended to be used for employee parking. However, it remained empty during all data collection periods.

- Duration

Duration data was collected for 50 on-street spaces along Ninth Street, from Perry Street to West Markham Avenue, and for the 46 off-street spaces located in the City leased surface lot on Ninth Street on October 18, 2012. These areas were selected, as they are within the core of the study area. Duration data was collected on a Tuesday, between the hours of 10:00 AM and 4:00 PM to capture a typical weekday condition.

As outlined in Table 3.2, there were 158 duration observations for the 50 on-street spaces and 102 duration observations for the 46 off-street spaces. The overwhelming majority of vehicles (76%) were parked for one hour or less, while approximately 15% of vehicles parked for more than 2 hours. This is a positive picture in regards to a majority of visitors obeying the posted time limits (2-hour and 3- hour). However, there are still a fair percentage of users taking advantage of the lack of enforcement within the study area by parking in a space for long periods of time.

Table 3.2 – Ninth Street Duration

Facility Type	0-1 hr	1-2 hr	2-3 hr	3-4 hr	4-5 hr	5-6 hr	Total
On-Street	121	16	12	5	2	2	158
Off-Street	76	9	6	3	5	3	102
Total Observations	**197**	**25**	**18**	**8**	**7**	**5**	**260**
Percent	**76%**	**10%**	**7%**	**3%**	**3%**	**2%**	**100%**

- Turnover

Turnover data was collected for the same on-street and off-street spaces as described in the previous section. Turnover is defined as the total number of vehicles per space over a given time period and should be reviewed in conjunction with duration and occupancy to obtain a complete and comprehensive understanding of the observed parking situation. Depending on the use, high or low turnover rates can be observed as good or bad. For example, in an employee parking area, one would expect low turnover rates, as vehicles are usually parked for long periods of time. Conversely, convenient customer parking spaces, such as those spaces observed in the Ninth Street study area, typically experience high turnover rates. In general, turnover rates can be influenced by many factors, including time restrictions, enforcement, land use, and location. The average turnover for on-street and off-street spaces is outlined in Table 3.3 below.

Table 3.3 – Ninth Street Average Turnover

Facility Type	Total Spaces Observed	Average Peak Occupancy	Total Vehicles Parked	Average Turnover
On-Street	50	39	153	3.92 veh/space
Off-Street	46	28	99	3.54 veh/space
Total	**96**	**67**	**252**	**3.76 veh/space**

As evidenced in Table 3.3, on-street spaces turnover at a greater rate than off-street spaces. This is typically the desired relationship between on-street and off-street space turnover for areas such as Ninth Street. Analyzing the data slightly differently, one can determine the number of vehicles that turnover each hour within the area that was observed. Table 3.4 does this by outlining the number of vehicles that vacated their parking space between the given hour time period and the preceding hour time period. The 10:00 AM – 11:00 AM time frame is left blank because data collection started within the 10 o-clock hour, therefore, data from the preceding time period is unavailable.

Table 3.4 – Ninth Street Hourly Turnover

Facility Type	10 AM – 11 AM	11 AM – 12 PM	12 PM – 1 PM	1 PM – 2 PM	2 PM – 3 PM	3 PM – 4 PM
On-Street	-	14	21	24	30	33
Off-Street	-	13	14	12	14	20
Total	**-**	**27**	**35**	**36**	**44**	**53**

As shown in the table, at least 25% (27 spaces) turnover each hour out of the 96 on-street and off-street spaces that were observed, with turnover increasing to over 50% (53 spaces) towards the end of the observation period.

Finally, turnover data can be used to determine the average length of stay for those that visit the study area. This can be calculated by dividing the average turnover into the length of time in which data was collected (six hours). This is outlined in Table 3.5.

Table 3.5 – Ninth Street Average Length of Stay

Facility Type	Average Turnover	Duration of Data Collection	Average Length of Stay
On-Street	3.92 veh/space	6 hours	1.53 hours
Off-Street	3.54 veh/space	6 hours	1.69 hours
Total	**3.76 veh/space**	**6 hours**	**1.59 hours**

As previously noted, the restricted time limit for the spaces where turnover data was collected is three hours for on-street spaces and two hours for off-street spaces. Comparing these restrictions to the average length of stay in the previous table suggests that the off-street lot spaces turnover prior to the time restriction by approximately 20 minutes (0.31 hours), while the on-street spaces also turnover prior to the time restriction by approximately 90 minutes (1.49 hours).

The City's plan to convert the observed off-street surface lot to a paid parking lot will change the relationship between the off-street and on-street average length of stay data presented. Shifting to a paid off-street lot will likely shift demand to on-street spaces, as users will attempt to avoid paying for parking. As a result, the City should consider allowing one or two hours of free parking in the City owned off-street surface lot, with a fee for those that require parking for longer periods. Pairing this with a recommended two hour time limit for on-street parking until a paid on-street program can be implemented could provide consistency throughout the study area. For the off-street and on-street parking in the heart of Ninth Street to work hand in hand, especially with the shift to a paid off-street lot, it is important that the City consistently enforce parking regulations within the study area.